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## Lensing function relation in Hadrons

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The transverse momentum parton distribution  $f_{1T}^\perp$ , known as Sivers function, is odd under the naive time-reversal transformation and gives rise to a transverse single spin asymmetry (tSSA) in semi-inclusive DIS (SIDIS). An intuitive picture to understand the origin of this asymmetry is to relate the average Sivers transverse momentum to the impact parameter parton distribution  $E$ , which describes the distortion of the spatial distribution of partons in the transverse plane. The connection between the two functions is realised through the “lensing” function, that arises from the final-state interactions between the active quark and the spectator partons.

However, this picture for the tSSA is valid only using a particular model for the proton. As a matter of fact, no relations between impact parameter distributions and transverse momentum distributions can exist in QCD. The relation is expected to be an artefact of the model, however it was not clear which features of the model originate it.

In this talk, I will present an argument that helps to understand the origin of this relation in models. To this aim, I will first discuss the pion case, as a prototype of a bound two-body system, and then the results for the proton, treated as both a quark-diquark state and a three-quark state.

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